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Compliments of the Author.

The Recent Advances in
Abdominal Surgery.

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RECENT ADVANCES IN ABDOMINAL SURGERY.

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BY THE PRESIDENT,

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TO the practitioners of twenty years ago the name of abdominal surgery was unknown, and the abdomen was a closed cavity, except by accident or autopsy, save to a few daring spirits, generally condemned, and at times even ostracized, known as ovariatomists. The peritoneum was the *noli me tangere* of the profession, and its injuries considered almost necessarily fatal. Wondrous as has been the revolutionizing of general surgery within this period, in no other department has there been such innovations or such marvellous success. Do we wonder that the honors won by the heroic innovators have been freely bestowed by a grateful people? The anatomy of the abdomen and its contents holds a position of importance, quite other than formerly, when it was considered of value chiefly from its physiological standpoint. Each of its important organs is now within the realm of conservative surgery, and their pathological conditions will be here considered briefly from the surgical point of view.

First in importance is the alimentary canal. The re-



cent valuable contribution of *Dr. Maurice H. Richardson, given in connection with his justly celebrated case of removal by gastrotomy of a plate of false teeth, lodged and retained in the œsophagus for more than a year, is worthy of careful study. The removal of foreign bodies from the stomach by section is plainly shown by experience to be justifiable, and, when done with the appliances of modern surgery, gives promise of brilliant results. Pyloric stricture, even when cancerous, may be accredited to come within the limit of permissible operation. The mortality from resection is not sufficiently great to deter operation ; even when the danger of recurrence is considered, the relief from slow starvation and pain is a fair offset, although return of the disease is considered inevitable. The one case of resection of the pylorus performed by me for cancer was in itself not a very difficult operation, and the death which ensued on the third day was evidently due to exhaustion, as the wound was hermetically sealed by the exuded lymph without septic inflammation.

The round, perforating ulcer of the stomach and duodenum, when reasonably clearly diagnosticated, may be regarded favorably from the surgical standpoint. Many cases are as terrible in their previous suffering and as fatal as cancer itself, while recovery following from excision would be permanent. A late distinguished member of our own profession, and my near neighbor, suffered for several years slow starvation, most severe pain, and finally death, from the

* " Boston Medical and Surgical Journal," Vol. CXV., p. 567.

perforation of a duodenal ulcer, although the other organs were healthy and he yet in the prime of a former splendid physical development.

Occlusion of the small intestine is not rare and, as a rule, is easy of diagnosis, whether from bands, intussusception, twists, hernia, or other cause; the danger of death is very great, and the usual custom of waiting until the patient is nearly moribund is, in a high degree, reprehensible. I have operated in a considerable number of cases, resulting in the saving of several lives. In two instances, ending fatally from especial causes, I removed a section of the intestine, and closed by a double, peritoneal, over-and-over tendon suture. The inflammations attendant upon foreign bodies in the appendix are usually fatal. Early surgical relief gives promise of a large percentage of cures.

Cancer of the rectum should be dealt with as coming within the limit of abdominal surgery. In many instances it is advised to dissect out the lower bowel without exsection until the healthy portion of the intestine is reached, and then to retain it by suturing to the healthy parts. This can usually only be done by entering freely the duplicated folds of the surrounding peritoneum.

Punctured and bullet wounds of the abdomen until very recently, and I fear now the general custom, were treated with opium, with death in waiting. Such wounds should be immediately examined with the greatest care, and, if in doubt as to the severity of the lesion of the abdominal organs, make exploratory incision, ligate all bleeding vessels, close

with punctilious care intestinal wounds, cleanse the peritoneal cavity, if required, by antiseptic washing, and the statistical lesson already teaches there will result a considerable saving of life.

Acute peritonitis from any cause is almost invariably septic, and this explains the extraordinary mortality resulting from it. Under such recognition it would seem a just deduction to open the abdomen and treat as any infected wound. In one instance, already published, I washed out the cavity repeatedly with weak solution of mercuric bichloride, followed by recovery. The micro-organism was a staphylococcus and was cultivated through several generations.

Weakness of the abdominal wall, giving hernial protrusion of the contents, has long been recognized as a legitimate field for surgical closure, but most of the operations still classic and advised in the standard text-books of the day are based upon the fear arising from exposure or injury to the peritoneum, and on this account are faulty. These blind, difficult operations, giving, as a rule, most imperfect results, are in a way to be superseded by simple incisions, usually through thin walls and structures involving few important vessels, with the careful adjustment and closure of the parts. I look with greater satisfaction upon the simple operation for hernia, now generally accredited to me as the originator, than almost any other contribution which I have made to surgery.

The walls of the ring are freely exposed, the peritoneal pouch removed if large, and the pillars and tendinous structures are approximated by tendon

sutures aseptically applied. This method, outlined in a single sentence, is applicable to all the varying forms of hernia, and, during an experience of sixteen years, I have never seen cause to regret its use, and, from the lesion of the abdominal wall alone, I have not had a single death. I do not hesitate to advise its use in all severe cases of hernia and, almost without exception, in the young.

Of the organs next in importance, the liver may be considered. Abscesses and hydatid tumors have been incised, but generally only after a surrounding inflammation has agglutinated the parts to the external surfaces, and it yet remains to be determined how much farther the surgical domain may extend to affections of the liver. In Mr. Tait's thirteen cases of hepato-tomy, the operation was in all a simple incision of the abdominal wall, emptying and cleaning the cyst, and stitching the cyst and abdominal wall together, with drainage-tube maintained until union between the two peritoneal surfaces had taken place.

In cases of injury causing hemorrhage it may be a justifiable operation to perform laparotomy and, by tampons of iodoform gauze, make compression, or, by the thermo-cautery, stop the hemorrhage.

Cholecystotomy is now well established as an operation to be advised in a large class of cases usually otherwise fatal, and which are yet generally relegated to the domain of medicine. Every practitioner has in mind a greater or less number of such cases. Within a short time two of my own friends have died from impacted gall-stone, as shown by autopsy, and the surgical measures advised were rejected because of

the adverse counsel of several of our best physicians. Mr. Tait calls attention to the fact that jaundice may not be an important symptom; indeed, in a number of his most interesting cases, it was never present. His experience is unprecedented, both in number of cases and percentage of recoveries. This subject is of universal interest, as the patients usually first come under the treatment of the physician. It should be emphasized that this operation is not to be relegated as a dernier resort. If it is clearly established that the gall-bladder is enlarged, with biliary obstruction, an early operation is advised, as statistics now show that operations upon the gall-bladder are followed by results as satisfactory as laparotomies from any cause.* The diagnosis is usually not difficult, and the enlargement of the gall-bladder is generally found on a transverse line, running from near the tip of the cartilage of the tenth rib on the right side, crossing the middle line slightly below the umbilicus. As a rule, aspira-

* In his contribution to the recent meeting of the British Medical Association Mr. Tait reports a summary of forty-nine operations performed upon the liver, and all but two were successful. Twenty-nine cases of cholecystotomy were followed by twenty-eight recoveries. "They establish beyond dispute that the operation, when properly performed, is as devoid of risk as any surgical proceeding possibly can be. In this particular it has the advantage over all the other proceedings advanced for the treatment of gall-stones, because in none of them has anything but a heavy mortality been obtained. The diagnosis of gall-stones is also in my hands at least approaching a greater degree of certainty than I ever thought it would do; indeed, in these twenty-nine cases, there were only three in which a mistaken diagnosis was made."

tion should not be resorted to as a means of diagnosis. Laparotomy, as a means of exploration, does not involve a much greater danger, and gives a far better diagnostic knowledge.

Let the incision follow the line of the tumor parallel to the curve of the rib. Stop with care all bleeding before opening the peritoneum. Make the opening large enough to examine carefully the bladder and ducts; two fingers may suffice, the whole hand if necessary. If a calculus is in the duct, release if possible, and determine the patency of the canal. If the contents of the bladder can then be pressed into the intestine, thus empty before opening. Use every precaution not to allow bile to enter the peritoneal cavity. After removing the calculi, in such cases, it is evidently better to close at once the opening with a carefully adjusted, over-and-over, continuous tendon suture, making a double puncture of the peritoneum by a needle, without cutting edges, on each side of the incision at every stitch, as advised in enterectomy. Thus the cut edges are turned in, and the peritoneal surfaces approximated, with an accurate adjustment impossible with the interrupted suture; the wound is soon sealed with an impenetrable lymph. Aseptically done, the danger is reduced to a minimum, and the result is perfect, avoiding the fistula, which at best is troublesome, and may be fraught with danger. Upon the authority of a number of operators, including Mr. Tait, it is often impossible to determine satisfactorily the patency of the duct. In these cases the only wise way is to establish a fistula by carefully approximating the divided edges of the gall-bladder to the peri-

toneal wound. The cut of an inch or more is done only after the bladder has been aspirated of its contents.

Prof. Langenbuch removed the gall-bladder by ligating the cystic duct, and has offered it as a substitute for cholecystotomy. He has reported ten cases with two deaths. Three other cases followed by recovery have been reported. Prof. Langenbuch has also twice crushed calculi in the common duct; once by means of forceps, once between the thumb and finger.

Dr. Gaston advocates the uniting of the gall-bladder to the duodenum, leaving a fistulous communication. He bases his opinion upon his interesting experiments with dogs. Eighty per cent. of the animals died, and Mr. Tait opposes the measure as virtually impracticable. Even after recovery there would be serious objection to such a connection, and it is clearly evident that the gall-bladder as a receptacle for bile is of less importance physiologically than earlier believed. Extirpation, when there is biliary obstruction, may be advised in a certain class of cases.

In ascites, from cirrhosis of the liver, or diseased kidney, the accumulated fluid adds much to the discomfort of the patient and hastens death. The serum is exuded from the distended capillaries, and the circulation is impeded in proportion to the pressure of the ever-increasing fluid. Dr. A. G. Caillè, of New York, recently reported two cases of ascites, dependent upon cirrhosis of the liver, treated by drainage. Although, from the nature of the disease, both cases resulted fatally, yet there was sufficient gain to war-

rant further trial. In June last, after an exploratory laparotomy, where there was an extraordinary effusion of ascitic fluid dependent upon cancer of the omentum, I introduced drainage, thereby greatly relieving the patient. December 8th I removed by tapping fifty pounds of fluid. Only a short time previous the patient had been tapped of a large quantity of fluid. He had been a drinking man. There was a diminished quantity of urine, with albumen and casts, as well as evidence of disease of the liver. On the 17th I again removed twenty-five pounds of fluid. January 1st, after the removal of thirty pounds, I stitched into the opening a piece of one-eighth inch rubber drainage-tube. The flow, which had been continuous, lessened, until on the 10th I removed the tube. There has been no fluid for two days, and no evidence of fluid in the abdomen. It remains to be seen if there will be a return of fluid, which is most probable. The tube was protected by a pad of iodoform wool. It is certain no inflammatory action was set up about the tube, and from the conditions pertaining to the abdomen, a cavity with elastic walls, it seems very unlikely that septic material would find its way back through the tube.

The valuable contribution of Dr. Senn, of Milwaukee, upon the surgery of the pancreas, opens a new chapter of possibilities. The removal of the spleen for a variety of causes has taught valuable lessons in physiology, as well as affording cure from visceral injury. Hemorrhage is the more common cause of death.

The removal of the kidney, when it has become a

cystic, or suppurating, tumor, is best accomplished by laparotomy. In certain conditions it may be preferable to reach it by a lumbar incision. When removed by laparotomy, it is advisable to close with care the posterior peritoneum. There are certain rare post-peritoneal tumors which come within the limit of abdominal surgery. The most notable instance under my own observation was afterward operated upon and a large part removed by Dr. Homans, followed by death. It was a pure lipoma, but impossible to diagnosticate before exploration. It weighed over fifty pounds.

Tumors of the mesentery come within the catalogue of surgical diseases, although rare.

Wounds of the bladder, formerly so severe and dangerous, are now closed and, when properly done, with such safety and success that lithotomy may again become the preferred operation, by supra-pubic incision.

In the "Obstetrical Journal" for October, under the report of the Transactions of the Obstetrical Society of Philadelphia for May, Dr. Harris contributes the following interesting summary of Snger's Cæsarean operation :

"I desire, through this Society, to give publicity to the following statement, received a few days ago, in a letter from Dr. Snger, of Leipzig, by which it will be seen that his method now stands unrivalled in the world in its ability to save human life.

"Locally considered, the Porro operation, as performed in the Santa Caterina Hospital of Milan, Italy, has, until recently, far exceeded, in its proportionate

success, all other Cæsarean methods in any hospital or country; but this, the best of all Porro successes, has now to be rated second, as compared with its younger German rival. Laparo-elytrotomy, a year ago, stood upon the same level with the Säger operation in its rate of success; but now, the latter far outstrips it in number of times it has been performed and in its proportion of cures.

"According to Dr. Säger's letter, his operation, with its modifications and simplifications, has been performed 25 times, saving 18 women (or 72 per cent.), and resulting in 22 children being delivered alive, or 88 per cent. In these are included three fatal American cases, which, if not in an absolutely hopeless state before the operation, gave a very minimum hope of success. The European 22 cases saved 18 women, or $81\frac{9}{11}$ per cent. In the Maternity Hospital of Leipzig, Dr. Säger has operated four times, Dr. Obermann once, and Dr. Donal once, saving all the women and children; in but one woman was there any special trouble after the operation. Dr. Leopold, of the Dresden Maternity Hospital, has operated nine times, and Dr. Carn once; the former lost one woman, all of the children were saved. Thus we have 15 women and 16 children saved under 16 operations, a mortality for the former of only $6\frac{1}{4}$ per cent. Of the four deaths in Europe, two resulted from septic poisoning which existed at the time of the operation, and in the other two subjects it followed it."

Fibroid tumors of the uterus, so common that it is claimed twenty to thirty per cent. of adult women

are thus affected, have received the study due such an important affection. The routine treatment of ergot, regardless of the relation of the growth to the uterus, may be hoped to have had its day, both for the benefit of sufferers and the physicians. It can be accepted, as demonstrated, that the value of ergot is limited almost entirely to intra-uterine growths where the uterine wall is sufficiently normal to cause muscular contractility, and thus by pressure either expel the tumor as a foreign body, or diminish its blood supply, and in this way interfere with its growth. The only wonder is that the profession have been so long in learning that constitutional remedies could hardly be expected to relieve, or cure local affections. Much of our present medical scepticism is the legitimate fruitage from disappointment in not obtaining results clearly beyond the domain of medication. Medicine, like surgery, must be rewritten in the near future, if it would be abreast with modern science.

The histology and development of uterine tumors are much better understood than formerly. The growth so presses upon the surrounding tissues that they are changed into a stretched-out network of muscular cells, making thereby an envelope or capsule. This, as a rule, causes the tumors to be early defined, even when interstitial, and it so changes the vascular supply that few vessels enter directly even the rapidly growing, soft myoma. The vessels of the tumor are injected with great difficulty even under hydrostatic pressure, but the surrounding vessels are greatly enlarged, generally ectasic and a considera-

ble amount of nutrition, evidently, is due to absorption.

These facts have a direct and important bearing upon the surgical relation and treatment of small myoma. I commenced my histological and pathological studies of uterine tumors in the belief that they would lead to the demonstration of the comparatively safe, and therefore advised, removal of small interstitial myoma, and thus save the patient unmutilated from further danger ; but I have found that it is the decided exception to have the myoma develop single, and when once established, from an as yet unknown cause, there is a tendency to recurrence.

From the increased vascular supply, the uterine wall incised over the growth bleeds immoderately, and is controlled with difficulty. The methods for controlling hemorrhage, which I have devised and which are now largely adopted, of the rubber dam and elastic ligature at the neck of the uterus, aid materially. Except the emptying of the divided veins the operation is bloodless. The so-called shoemaker's stitch (the needle, set in a handle without a cutting-point and eye near the end, carries a tendon back and forth through the same puncture in continuous suture) was adopted for a further aid to this purpose, although its use has now been applied for a variety of purposes. By it, the coapted uterine walls may be retained, and the peritoneal surfaces closed by a fine over-and-over tendon, or catgut suture. The needle punctures are liable to ooze and have given, at times, trouble, obliging me in one case to perform hysterectomy.

Of course, when the tumor is large and operation is admissible, hysterectomy is the only recourse. This has been proved to be so serious an operation, and followed by so large a percentage of mortality, that it is thus far advised only when the tumor itself endangers life. A large factor in the mortality is the ensanguinated and exhausted state of the patient, which causes the operation to be advised as an alternative.

When done, there can be no doubt that the temporary ligation of the uterine neck by the elastic ligature, as referred to above, adds greatly to the ease and safety of the operation. I have also found Sir Spencer Wells's large compression forceps of material assistance. The stump should be cut in double flap, the mucous membrane of the cervical canal carefully disinfected with $\frac{1}{500}$ mercuric bichloride, the parts adjusted and coapted by continuous suture, as advised in excision of small growths, and the cleansed vagina tamponed with iodoform cotton. The removal of the appendages to lessen the uterine growths has become, through the labors of Battey, Savage, and Tait, well established. It lessens, of course, the blood supply to the organ, and thereby diminishes nutrition of the uterus, but it accomplishes much more in arresting the physiological function of ovarian action, and thus changing the cellular activity of the uterine structure. The glandular proliferation which accompanies menstruation ceases, and in a very large number of cases the tumor not only does not enlarge, but, on the contrary, slowly atrophies, and in some instances disappears altogether. This, aseptically done, in a comparatively vigorous woman, gives promise of

excellent results. There can be no doubt but a large class of women now relegated to protracted suffering and death, at long range, can be restored to health and vigor by surgical intervention.

We owe to our justly famous cotemporary, Dr. Robert Battey, the distinguished meed of having defined and established the operation for the removal of diseased ovaries when not enlarged from cystic degeneration. It was a still greater gain to science when Mr. Tait enlarged the field of the operation to include diseased uterine appendages. To Dr. Noggeroth, of New York, belongs the honor of having shown the relationship of salpingitis to gonorrhœal affections as, in a large degree, casual. The now well-established rôle of this peculiar surgical ferment aids materially in diagnosis and treatment.

Gonococci, locked up in an enlarged fallopian tube, not only give local trouble not amenable to medication, but often threaten life itself by their escape into the surrounding parts. The only fatal case occurring in my experience after repair of the cervix, a list of operations now so large as to be scarcely thought worthy of separate record, was a septicæmia, dependent upon a dilated suppurating tube, not discovered until at autopsy.

It may be well to consider, if a large share of our so-called pelvic inflammations are not dependent upon local infections from a variety of surgical ferments, rather than from the time-honored causes of "catching cold," wet feet at menses, etc.

Dr. Wiley, of New York, has published a considerable list of cases, accepted at Bellevue Hospital as

incurable, where the removal of the uterine appendages restored the women to health. The tubes were invariably diseased, with ovaries bound down by adhesions. Nearly all had led a life of prostitution.

Dr. Gordon, of Maine, has contributed within the year to this Society a long list of operations for the removal of the ovaries and tubes with excellent results. At our last meeting I exhibited the specimens recently removed, and the patient is now convalescent, of greatly enlarged tubes with ovaries, also enlarged and matted together with adhesions. The case is interesting, chiefly from the fact that the patient was under my personal care when suffering from acute gonorrhœa years since, and has remained until now a sad invalid, never amenable to medical treatment.

After this necessarily hasty and imperfect review there remains only to note the recent advances in ovariectomy, the operation which paved the way for the wide field of abdominal surgery. Here the great advance made in general surgery by aseptic measures is equally pronounced. Putting aside shock to the vital force, hemorrhage, etc., the great danger, overshadowing by far all others, is septic infection. Mr. Tait, as a leader in surgery, stands almost alone in opposition to the statement. Infection, with little doubt, comes chiefly from hand and sponges. The most scrupulous Listerian disciple cannot outvie Mr. Tait in enforced cleanliness. His sponges are an especial care and just pride, while no operator more carefully removes the very material, too often left in the pelvic basin, which will serve as food for bacterial development.

Spray may be superfluous, but I do not feel safe to omit its use. The operating-room, as in all laparotomies, must be not only clean, but well disinfected. The hands, arms, sponges, and ligatures are thoroughly disinfected with $\frac{1}{1000}$ bichloride mercuric; instruments with $\frac{1}{40}$ acid carbolic. Irrigation is to be used, of $\frac{1}{2000}$ mercuric bichloride, so far as the wounds will permit—in a word, a thorough antiseptic operation.

The abdominal incision is made as short as can be practical, but nothing is gained by undue effort to work through a narrow opening. The greatest gain is from the intra-peritoneal method of treating the pedicle, here as well as with the ablated uterus. It is easy to understand why, when considered from the infectious standpoint, extra-peritoneal pedicles are a constant source of danger, even under the most careful dressing. The only possible gain can be from fear of hemorrhage. This may be practically excluded by careful sewing with the double tendon suture as I have advised.

Dr. H. R. Storer made a marked step in the advance, in treatment of the pedicle, in advocating the disuse of the clamp and "pocketing;" namely, suturing the pedicle, through and through, to the peritoneal surfaces of the wound and then enclosing it with the divided wounded surfaces of the abdominal wall.

The late Dr. Miner, of Buffalo, treated the pedicle by his so-called method of stripping.

The careful study of an ovarian tumor will show that it has developed from beneath the reflected peri-

toneum of the gland, and that it may, in large measure, with care be enucleated from its investment. This is what Dr. Miner called stripping. When thus done, the fan-like expansion of the vessels over the growth is torn asunder, and the long subdivided vessels easily contract and may not bleed, even without a single ligature.

I have modified the treatment of the ovarian stump quite as advocated in the treatment of the uterine stump. With a strong tendon I sew the pedicle, if broad, with ten or twelve stitches. Thus ligated, the contraction is much less marked, and dragging on the tissues beneath is lessened. Then I separate, after the manner of Dr. Miner, the reflected peritoneum sufficient to cut a considerable border above the stitches. This secures the turning in of the cut edges, and the over-and-over suture, taken only through the free peritoneum, enables the operator to cover the stump with peritoneum entire, while the sewing is a further prevention from hemorrhage.

After practice only a little more time is consumed than in the ordinary way. The advantage is safety from hemorrhage, as the ligation can never slip and there is no necrotic tissue for absorption, as with a strangulating silk ligature, or charred from the use of the thermo-cautery, and, most of all, no absorptive surfaces for germ infection. The advance of ovariectomy in America has been rapid and very creditable to our profession. Born of American genius, cultured by the masters of Great Britain, it has given to the world the blessing of modern abdominal surgery, the greatest triumph of our art.

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